Interim Report on Subtask III
Foreign Shipbuilding Standards

A Compendium of Shipbuilding Standards

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THE NATIONAL SHIPBUILDING RESEARCH PROGRAM:

TASK S-20

A COMPENDIUM OF SHIPBUILDING STANDARDS

Interim Report
on
Subtask III
Foreign Shipbuilding Standards

U. S. Department of Commerce
Maritime Administration

In Cooperation With:

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EXECUTIVE SUMMARY

1. The purpose of Task S-20 of the Ship Producibility Research Program is to review shipbuilding and other industrial standards for possible us. in the National Shipbuilding Standard Program and to catalogue those standards that appear to have potential application within the program for ASTM F-25 Subcommittee action. This report covers results of Subtask III whose objective was to screen and catalog existing foreign shipbuilding standards.

2. There are, in all, about 750 shipbuilding standards issued by the major foreign standards organizations. Two hundred and sixty-three standards were available in English at the start of the study. All of these standards plus a few additional standards published in German were reviewed and catalogued for a total sample of 446 standards. Sources of standards reviewed included: DIN, JIS, ISO, and IEC. Regulatory standards issued by Foreign Classification Societies fell out side the scope of Task S-20. SIS standards will be included later, having been received too late for this report.

3. All standards were classified into four different types of groupings:

- Originating organization
- Navy Ship Work Breakdown Structure
- Subject
- Suggested F-25 Subcommittee assignment

All 446 standards were sorted by ADP equipment in accordance with each of these four sorting criteria, and then analyzed manually.

4. The most significant observations drawn from the sample of foreign standards are the following:

a. Foreign maritime interests appear to be adequately served by a library of 500 to 1000 shipbuilding standards which seems an eminantly reasonable target for F-25.

b. By far the heaviest concentration (86%) of foreign shipbuilding standards falls within the charters of Piping, Outfitting and Electrical Subcommittees of F-25 with the remainder scattered across the other Subcommittees. This distribution reflects the fact that foreign shipyards apply standards to that material which is mostly purchased where standardization can reduce purchase prices and installation labor.

c. Virtually all the foreign standards screened and catalogued are potentially useful to the U. S. Shipbuilding Industry and could be adopted with little or no change if superior alternatives are not uncovered during Subtasks I and II.

5. Further analyses of foreign standards will be accomplished after these have been integrated into the set of standards (largely regulatory) developed under Subtask I whose report is to be available in April 1979.

EDITORS NOTE

This is a report of Subtask III only. Reports will also be issued on Subtasks I in April and on Subtask II in May. The Final Report will be issued in June combining and comparing the findings of Subtasks I, II and III. Some updating of this report may take place before it is incorporated into the final report. The F-25 subcommittee assignments are preliminary pending Executive Subcommittee of ASTM Committee F-25 on Shipbuilding approval. The computer runs were made directly from key entry data without any error search. SWBS categories are on a best fit basis. Anyone wishing to have any erratta corrected, should contact Mr. James A. Burbank, at Corporate-Tech Planning Inc., John Hart Mansion - The Hill, Portsmouth, New Hampshire 03801, telephone number 603-431-5740.

1.1 Purpose

The purpose of Subtask III is to make available a compendium of foreign shipbuilding standards which are suitable for use in the United States. These standards are to be indexed so that a potential user can locate the standards which he needs from a listing by standard number, subject or ship work breakdown structure. To assist in the administration of the National Shipubilding Standards program by ASTM[1] Committee F-25 on Shipbuilding, the standards are also listed by the F-25 sub-committee with cognizance in the area of shipbuilding most impacted by each foreign standard.

1.2 Scope

Although there are other foreign standards writing groups, the greatest influence on shipbuilding standards comes from these five organizations:

- International Organization of Standards (ISO)
- International Electrotechnical Commission (IEC)
- Japanese Standards Association (JIS)
- German Standards Institute (DIN)
- Swedish Institute of Standards (S1S)

Standards written by other organization tend to apply to parts which have an applicable standard written by one of these groups.

Four hundred and forty six standards were reviewed and are included in this report. Seven Swedish Shipbuilding Standards, available in English translation, will be included in a subsequent report since they were not available in time for this

[1] ASTM stands for the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103

report. Tabel 1-1 summarizes the distribution of the standards by originating organization. Approximately 28,000 standards have been published by these groups. About 757 of these standards were directly classified as shipbuilding standards. However, many standards which are not called shipbuilding standards are used by foreign shipbuilders to assist in the design and construction of ships. For example, the alloy and physical property standards for materials are needed by shipbuilders as well as by other fabricators. For the purpose of this report 446 standards were examined including 106 which were developed by a German shipyard and then made available to any other yard wishing to use them. Some of these are being processed for possible inclusion in the body of ISO standards. These shipyard standards have not been translated into English yet, but will be translated by IS0.

1.3 Method

The shipbuilding standards were read and the fallowing information transferred from the standards to a coding form:

- Name of organization which published standard
- Number identifying the standard
- Year of latest revision
- Year of latest review and reaffirmation of content without modification
- Full title of standard
- System of units in standard (metric, English, both)

Sometimes the same standard is issued by more than one Organization. For example, the American National Standards Institute (ANSI) publishes standards written by the American Society for Testing and Materials (ASTM) or by the Society of Automotive Engineers (SAE). When another issuing standards organization

STANDARDS ORIGINATING ORGANIZATION	NUMBER OF STANDARDS				
	TOTAL STANDARDS	SHIPBUILDING STANDARDS	SHIPBUILDING STANDARDS IN ENGLISH	REVIEWED FOR SUBTASK III	% OF ENGLISH SHIPBUILDING STANDARDS RECEIVED
1. ISO	5703	59	59	59	100%
2. IEC	738	68	68	68	100%
3. JIS	7700	512	125	125	100%
4. DIN	13640	118	11	88	100%
5. SHIPBUILDING COMPANY STANDARDS	N.A.	N.A.	0	106	N.A.
TOTAL STANDARDS EXAMINED	27781	757	263	446	100%

TABLE 1-1: SUMMARY OF STANDARDS BY ORIGINATING ORGANIZATION

(N.A. = NOT AVAILABLE)

was known that information was also enclosed to show:

- Name of other issuing organization
- Number used by that organization to identify the the standard
- Year of latest revision or reaffirmation action

In addition to the factual data recorded, several decisions were made about the contents of the standards. These were:

- SWBS: The standards were coded to that category in the Navy Ship Work Breakdown Structure into which it seemed to best fit.
- F-25 Subcommittee: Cognizant subcommittee assignment was proposed based on scopes established for the subcommittee of the ASTM committee F-25 on shipbuilding.
- Subjects: Up to three subjects were entered on the coding sheets for each standards to show the scope of the standard.

Appendix C contains a sample coding sheet with a more detailed discussion of the processing of the standards and additional information that may be entered on the coding sheet for a standard.

The SWBS categories were selected under the guidance from Code 6121 of the Naval Ship Engineering Center. However, since standards tend to be about subjects (like springs) and SWBS tends to be organized by systems (many of which might use the same spring) it is not always possible to find a single right SWBS home for a standards. When faced with several equally logical SWBS codes to use, we tried to use the one which would be most useful to a Naval Architect or Marine Engineer figuring that these professionals would be the persons most likely to use the SWBS system to locate standards.

The proposed F-25 subcommittee assignments should be reviewed by the Executive Subcommittee F-25 who will make the official assignments.

Appendix D contains the printouts which resulted from the computer processing of the coding sheets described above. The four primary sorts which were made are:

- Originating Organization
- SWBS Number
- F-25 Subcommittee
- Subject

The Users Guide, which is included in Appendix A, contains 'explanations for the abbreviations and numbers used in the ADP runs. Although all of the information on the coding sheets was key entered on magnetic tape, only four sorts were made. Consequently, only the first subject entry is sorted. Alternative subjects are printed, but not sorted.

In section 2.0 of this report, we have presented an analysis of foreign standards. Most of the information was manually extracted from the four sorts in Appendix D. The data base includes 446 standards with a minimum of 12 items of information about each one. The maximum number of items is 17 for each foreign standard. This means that the maximum size of data base that can be economically sorted manually has just about been reached.

2.1 ANALYSIS OF FOREIGN STANDARDS

2.1.1 Originating Standards Organization

Several conclusions can be reached from studying the findings of this subtask. Of the standards reviewed, the greatest number were written by the Japanese (28% of the sample) while the fewest were ISO (13% of the sample) with the three others in between. Table 2-1 shows the number of standards and percent by originator by classification. (Table 2-1 appears on the next page.)

Also we find the spread in subject matter to be very large. Almost half of the standards-apply to auxiliary systems (SWBS group 500-599). Table 2-2 shows the precent of standards which

ORIGINATING ORGANIZATION	ISO	IEC	JIS	DIN	SY	TOTAL
% OF STANDARDS IN SWBS 500-599 AUXILIARY SYSTEMS	41%	3%	49%	70%	67%	49%

TABLE 2-2: PERCENT OF STANDARDS OF EACH ORIGINATING ORGANIZATION WHICH WERE CLASSIFIED INTO SWBS GROUP 500, AUXILIARY SYSTEMS.

fell into the SWBS group 500-599 (Auxiliary Systems). The efforts of the IEC are mostly directed towards standards for the electric plant (SWBS 300-399) where 47% of these standards were classified. Electrical definitions (classified in SWBS 000-099) accounted for another 15% of the IEC standards.

The 60 standards classified in SWBS 100-199, Hull Structure, qenerally cover penetrations and closures for windows, doors, hatches and the like.

No standards were found which applied to the hull structure directly, since hull structure falls within the purview of the foreign classification societies (Subtask I will report on Classification Societies).

SWBS IDENTIFICATION NUMBER GROUP	SWBS TITLE	ISO	IEC	JIS	DIN	SY	SUB TOTAL	%
0-99	GENERAL GUIDANCE & ADMINISTRATION	4	10	1	0	0	15	4
100-199	HULL STRUCTURE	8	0	25	17	10	60	13
200-299	PROPULSION PLANT	2	5	1	0	10	18	4
300-399	ELECTRIC PLANT	0	32	5	0	0	37	8
400-499	COMMAND AND SURVEILLANCE	6	13	6	0	4	29	7
500-599	AUXILIARY SYSTEMS	24	2	61	62	71	220	49
600-699	OUTFIT AND FURNISHINGS	15	1	26	9	11	62	14
700-799	ARMAMENT	0	0	0	0	0	0	0
800-899	INTEGRATION/ENGINEERING	0	0	0	0	0	0	0
900-999	SHIP ASSEMBLY AND SUPPORT SERVICES	0	5	0	0	0	5	1
	TOTAL	59	68	125	88	106	446	100
	% BY ORGANIZATION	13	15	28	20	24	100	

TABLE 2-1: DISTRIBUTION OF STANDARDS BY NAVY SWBS GROUP AND BY ORIGINATING ORGANIZATION

Table 2-3 shows the precent of the total number of slandards in the sample that were classified in SWBS group. 100-199, Hull Structure for each issuing organization.

ORIGINATING ORGANIZATION	ISO	IEC	JIS	DIN	SY	TOTAL
% OF STANDARDS CLASSIFIED INTO HULL STRUCTURE GROUP	14%	0%	20%	19%	10%	13%

TABLE 2-3 PERCENT OF STANDARDS OF EACH ORIGNATING ORGANIZATION WHICH WERE CLASSIFIED INTO SWBS GROUP 100, HULL STRUCTURE

2.1.2 Type of Standard

The classification of the standards by type is summarized in Table 2-4. The classification is based on the most likely use of the standard by shipbuilders. Significantly, the largest single item for each issuing organization is specifications, which make up 88% of the total for all the organizations.

The foreign standards are not "how to" documents, but are descriptions of articles. The foreign standards give dimensions, (including tolerances) for commodity items such as valves and pipe. They also give dimensions (including tolerances) on manufactured items such as doors and windows. Note that knowing the interface dimensions of purchased items permits the shipbuilder to continue construction of the ship even if the manufactured item is not in stock or even ordered. The builder, by buying to a. standard, has the benefit of certified drawings for the key dimensions. Because the builder does not have "reserved" areas, he can continue building the ship in the planned orderly manner. When the standard part is needed, it should fit the standard space prepared for it.

STANDARD TYPE CODE	MEANING	ORIGINATING ORGANIZATION						
		DIN	ISO	JIS	IEC	SY	TOTAL	%
1	DEFINITION CLASSIFICATION	3	7	---	7	---	17	4
2	DESIGN	1	11	7	3	---	22	5
3	PRODUCTION OPERATIONS	2	1	---	1	---	4	1
4	TEST METHOD OR PROCEDURE	---	2	---	7	---	9	2
5	SPECIFICATION	82	37	118	49	106	392	88
	UNCODED	---	1	---	1	---	2	0
	TOTAL	88	59	125	68	106	446	100
	% OF TOTAL	20	13	28	15	24	100	100

TABLE 2-4: DISTRIBUTION OF STANDARDS BY TYPE AMONG ORIGINATING ORGANIZATIONS

The foreign standards writing groups have provided documents which can assist in pricing, marketing, engineering, production scheduling and construction.

2.1.3 Units of Measurement

As expected, all of the dimensions on the foreign standards (Table 2-5) were in metric or S.I. units (meters, kilograms, seconds, radians, tonnes, Celsius, etc.). Fifteen percent of the standards had English units as well. Dual dimensioning is the standard practice of IEC. TWO percent of the standards did not include any dimensions and thus had no units.

SYSTEM OF UNITS CODE MEANING	ORIGINATING ORGANIZATION						
	DIN	IS0	JIS	IEC	SY	TOTAL	%
M METRIC OF S.1.	88	50	125	1	106	370	83
E ENGLISH	---	---	---	---	---	0	0
N NOT APPLICABLE	---	8	---	---	---	8	2
u UNKNOWN	---	---	---	---	1	1	0
0 OTHER	---	---	---	---	---	0	0
D BOTH	----	1	---	66	---	67	15
TOTAL	88	59	125	68	106	446	100

TABLE 2-5: UNITS OF MEASUREMENT USED IN FOREIGN STANDARDS

2.1.4 Potential Value to U.S. Shipbuilding Industry

Almost all (99%) of the standards reviewed offer potential benefits to U.S. shipbuilders. The other 1% were IEC standards which defined test methods for electric cable and

apparatus manufacturers. These standards would not be used By the shipbuilders, but were useful to the electrical manufacturers.

POTENTIAL BENEFIT	ORIGINATING ORGANIZATION						
CODE "MEANING	DIN	IS0	JIS	IEC	SY	TOTAL	%
0 NONE	---	---	---	6	---	6	1
1 MARGINAL	---	4	1	34	---	39	9
2 MODERATE	88	4	124	23	106	345	78
3 GREAT	---	51	---	4	---	55	12
MISSING CODE	---	---	---	1	---	1	0
TOTAL	88	59	125	68	106	446	100

TOBLE 2-6: RATING OF FOREIGN STANDARDS IN TERMS OF POTENTIAL BENEFITS TO U. S. SHIPBUILDERS.

The IS0 standards won higher potential benefit ratings because the subjects (windows, scuttles, ladders, clocks, compasses, etc.) were of greater use. For this reason many of these standards have been raised from national standards to international standards. Also most of these items are manufactured outside the shipyard, and standards assist in purchasing such items.

2.1.5 Changes Required for Use of Standards in U. S. Shipbuilding

All of the standards were classified as requiring no modifications in order to be useful to U.S. Shipbuilding. Since these standards are published for general use anyone wishing to cite them may do so as long as other contractual obligations are met. Good standards assist in communications between all affected parties in shipbuilding. These standards have been helping foreign shipbuilders and can assist the U.S. yards if properly utilized.

MODIFICATION CODE	MEANING	(ORIGINATING ORGANIZATION						
		DIN	IS0	JIS	IEC	SY	TOTAL	%
1	MAJOR	---	---	---	---	---	0	
2	MINOR	---	---	---	---	---	0	
3	NONE	88	59	125	68	106	446	
	TOTAL	88	59	125	68	106	446	

TABLE 2-7: CHANGES REQUIRED BEFORE FOREIGN STANDARDS MAY BE USED BY U.S. SHIPBUILDERS.

2.2 Analysis of SWBS Groupings

The Navy's Ship Work Breakdown Structure (SWBS) uses three digit identifiers for ten groups of ship systems. These ten groups are:

GROUP NAME	IDENTIFYING NUMBER
General Guidance and Administration	000-099
Hull Structure	100-199
Propulsion Plant	200-299
Electric Plant	300-399
Command and Surveillance	400-499
Auxiliary Systems	500-599
Outfit and Furnishing	600-699
Armament	700-799
Integration/Engineering	800-899
Ship Assembly and Support Services	900-999

The SWBS was developed by the Navy to provide a method for classifying parts and components according to the system in which they are used. Some of the material covered by the foreign standards is used in two or more different systems so that the assignment of a SWBS group had to be based on the analysts best judgement of what group or system a marine engineer would expect to

find the item. Some standards, such as the one for springs, have no natural home in a ship systems oriented structure since standard springs are used in many ship systems. Whenever classification problems were encountered, guidance in classification was obtained from Code 6121 of the Naval Ship Engineering Center (the cognizant office for maintaining the SWBS).

The next several tables show the distribution of the standards within each SWBS group.

SWBS NUMBER	TITLE	NUMBER OF STANDARDS
42	GENERAL ADMINISTRATIVE REQUIREMENTS	6
70	GENERAL REQUIREMENTS FOR DESIGN AND CONSTRUCTION	1
77	SAFETY	1
78	MATERIALS	4
86.	TECHNICAL MANUALS AND OTHER DATA	2
95	WHOLE SHIP TESTING	1
0-99	GENERAL GUIDANCE AND ADMINISTRATION	15

TABLE 2-8: FIFTEEN STANDARDS WERE FOUND TO APPLY TO THE GENERAL GUIDANCE AND ADMINISTRATION GROUP.

The General Guidance and Administration Group (SWBS No's. 000-099) include four on aluminum or copper specifications. In the United States, aluminum specifications (chemistry, physical properties, etc.) are issued by the Aluminum Association for use in all industries. Only 4 of the foreign standards examined were developed for shipbuilding material. The remaining material standards needed by the shipbuilders are found in other classifications. The 4 ISO technical groups devoted to the Basic Materials steel, aluminum, magnesiam, zinc and copper have written over 200 standards for publication.

Table 2-9 we have a breakdown of standards which apply to the Hull Structure SWBS Group. These comprise of 13% of the standards reviewed.

The 38 standard in Subgroup 167 (Hull Structural Closures) include heavy hinged bulkhead doors, windows, scuttle and manhole covers, tank cleaning openings and hatches. Twelve of the standards apply to deck penetrations for pipe. Seven apply to hatch fittings. All of these standards appear to be directly useful to U.S. builders. The reason that the pipe penetrations are directly transferrable is that European normal pipe sizes are the same as U.S. pipe dimensions.

SWBS NUMBER	TITLE	NUMBER OF STANDARDS
100	HULL STRUCTURE, GENERAL	10
101	GENERAL ARRANGEMENT-STRUCTURAL DRAWINGS	1
121	LONGITUDINAL STRUCTURAL BULKHEADS	2
167	HULL STRUCTURAL CLOSURES	38
169	SPECIAL PURPOSE CLOSURES AND STRUCTURES	8
199	HULL REPAIR PARTS AND SPECIAL TOOLS	1
100-199	HULL STRUCTURE	60

TABEL 2-9: SIXTY STANDARDS WERE FOUND TO APPLY TO THE HULL STRUCTURE GROUP.

There were 18 standards (Table 2-10) classified into SWBS group 200-299 (Propulsion plant), which is onlY 4% of the standards studied. Five of these developed by a German shipyard deal with expansion joints for the uptakes. Another five were published in IEC-1 to cover hish voltage switchear. IEC-92 covers high voltage meters

SWBS NUMBER	TITLE	NUMBER OF STANDARDS
200	PROPULSION PLANT, GENERAL	4
235	ELECTRIC PROPULSION	4
245	PROPULSORY	1
252	PROPULSION CONTROL SYSTEM	1
259	UPTAKS (INNER CASING)	8
200-299	PROPULSION PLANT	18

TABLE 2-10: EIGHTEEN STANDARDS WERE CLASSIFIED IN THE 200-299 PROPULSIONS PLANT GROUP

Twice as many standards fell into SWBS Group 300-399 (Electric Plant). Thirty-seven standards represent 8% of the total of 446 standards. This group includes non-propulsion electrical gear. General definitions, standard voltages, cable selection and power equipment are included. Eighteen of the standards were issued IEC-92. (See Table 2-11.)

SWBS NUMBER	TITLE	NLMBER OF STANDARDS
300	ELECTRIC PLANT, GENERAL	6
302	MOTORS AND ASSOCIATED EQUIPMENT	6
303	PROTECTIVE DEVICES	3
304	ELECTRIC CABLES	4
311	SHIP SERVICE POWER GENERATION	3
313	BATTERIES AND SERVICE FACILITIES	1
314	POWER CONVERSION EQUIPMENT	3
324	SWITCHGEAR AND PANELS	4
330	LIGHTING SYSTEM	4
331	LIGHTING DISTRIBUTION	2
332	LIGHTING FIXTURES	1
300-399	ELECTRIC PLANT	37

TABLE 2-11: THIRTY SEVEN STANDARDS WERE FOUND TO BE IN THE SWBS GROUP 300-399, ELECTRIC PLANT.

Seven percent of the standards reviewed fall into SWBS Group 400-499 (Command and Surveillance). Table 2-12 shows the distribution within the group. Twelve of these standards were issued by IEC and cover cables, alarms, internal communications, lamps and relays. Five are IS0 standards dealing with the magnetic compass and accessories.

SWBS NUMBER	TITLE	NUMBER OF STANDARDS
404	RADIO FREQUENCY TRANSMISSION LINES	3
407	ELECTROMAGNETIC Interference REDUCTION (EMI)	1
421	NON-ELECTRICAL/Electronic Navigation AIDS	6
422	ELECTRICAL NAVIGATION AIDS (INCL. NAVIG. LIGHTS)	1
430	INTERIOR COMMUNICATIONS	1
432	TELEPHONE SYSTEMS	1
435	VOICE TUBES AND MESSAGE PASSING SYSTEMS	1
436	ALARM, SAFETY, AND WARNING SYSTEMS	3
437	INDICATING, ORDER, AND METERING SYSTEMS	5
443	VISUAL AND AUDIBLE SYSTEMS	2
400-499	COMMAND AND SURVEILLANCE	29

TABLE 2-12: TWENTY NINE STANDARDS APPLY TO THE COMMAND AND SURVEILLANCE SMBS GROUP.

Almost half of the standards were classified as apply to Auxiliary Systems (SWBS Numbers 500-599). Of these 220 standards, 95 (or 43%) applied to General Piping Requirements, 29 (or 13%) applied to Mechanical Handling Systems and 25 (or 11%) to Mooring and Towing Systems.

SWBS NUMBER	TITLE	NUMBER OF STANDARDS
500	AUXILIARY SYSTEMS, GENERAL	3
501	GENERAL ARRANGEMENT-AUXILIARY SYSTEMS DRAWIINGS	1
505	GENERAL PIPING REQUIREMENTS	95
506	OVERFLOWS, AIR ESCAPES, AND SOUNDING TUBES	7
507	MACHINERY AND PIPING DESIGNATION AND MARKING	1
511	COMPARTMENT HEATING SYSTEM	1
512	VENTILATION SYSTEM	7
516	REFRIGERATION SYSTEM	1
521	FIREMAIN AND FLUSHING (SEA WATER) SYSTEM	9
526	SCUPPERS AND DECK DRAINS	6
528	PLUMBING DRAINAGE	6
530	FRESH WATER SYSTEMS	1
540	FUELS AND LUBRICANTS, HANDLING AND STOWAGE	4
544	LIOUID CARGO	4
556	HYDRAULIC FLUID SYSTEM	1
561	STEERING AND DIVING CONTROL SYSTENS	5
573	CARGO HANDLING SYSTEMS	5
580	MECHANICAL HANDLING SYSTEMS	29
581	ANCHOR HANDLING AND STOWAGE SYSTEMS	7
582	MOORING AND TOWING SYSTEMS	25
583	BOATS, BOAT HANDLING AND STOWAGE SYSTEMS	2
591	SCIENTIFIC AND OCEAN ENGINEERING SYSTEMS	1
599	AUXILIARY SYSTEMS REPAIR PARTS AND TOOLS	1
500-599	AUXILIARY SYSTEMS	220

TABLE 2-13: ALMOST HALF OF THE FOREIGN STANDARDS APPLIED TO AUXILIARY SYSTEMS.

There are several reasons for the preponderance of slandards in this SWBS group. First, more parts for commercial ships fall into this group than into most other groups. Second the parts in this group are often closely related to, but different from, non-marine equipment so that standards are needed to define their unique requirements. Also, many parts used in auxiliary systems are purchased from outside vendors. Standards assist in defining the product to be purchased. Fourth, the European standards organizations started with large pieces and worked their way down to valves, flanges, and pumps. The Japanese standards effort began with small pieces and worked towards larger items. The two efforts tend to meet in the auxiliary systems area.

It is fortunate for the U.S. builders that there are so many standards available in this SWBS category because the shipbuilder usually has more opportunities to decide to use these standards than in any other group.

The next most useful SWBS group of standards is Outfit and Furnishings (Table 2-14). There were 62 standards in this group - or 14% of the total. This group was dominated by standards for ladders (37% of the 62 standards in this group). JIS originated more of these standards than ISO, DIN, or the European shipyards, although each group contributed at least 3 standards. Table 2-14 summarizes the distribution of standards in this subgroup.

SWBS NUMBER	TITLE	NUMBER OF STANDARDS
600	OUTFIT AND FURNISHINGS, GENERAL	1
601	GENERAL ARRANGEMENT-OUTFIT AND FURN. DRAWINGS	4
602	HULL DESIGNATING AND MARKING	5
610	SHIP FITTINGS	4
611	HULL FITTINGS	5
612	RAILS, STANCHIONS, AND LIFELINES	5
613	RIGGING AND CANVAS	3
623	LADDERS	23
624	NON-STRUCTURAL CLOSURES	2
625	AIRPORTS, FIXED PORTLIGHTS, AND WINDOWS	6
640	LIVING SPACES	1
651	COMMISSARY SPACES	1
673	CARGO STOWAGE	2
600-699	OUTFIT AND FURNISHINGS	62

TABLE 2-14: FOURTEEN PERCENT OF THE STANDARDS EXAMINED WERE CLASSIFIED IN THE OUTFIT AND FURNISHINGS GROUP.

2.3 Analysis by ASTM F-25 Subcommittee.

2.3.1 General Observations

There is no direct correspondence between SWBS numbers and F-25 subcommittee structure. Although all standards within two SWBS groups (000-099 and 900-999) were assigned to two separate subcommittees respectively, this result is due to the similarity of the subjects of the standards, not to the inherent similarity of the SWBS subjects. When more standards are classified into these two SWBS groups, it is very likely that additional F-25 subcommittees will be involved. Assignment of standards in the Auxiliary Systems SWBS Group spread across seven F-25 subcommittees (Table 2-15).

SWBS	SWBS TITLE	F-25 SUBCOMMITTEE
0-99	GENERAL GUIDANCE	03 - OUTFITTING
100-199	HULL STRUCTURE	03 - OUTFITTING 04 - HULL STRUCTURE
200-299	PROPULSION PLANT	ELECTRICAL AND ELECTRONICS 10 - MACHINERY 13 - PIPE SYSTEMS
300-399	ELECTRIC PLANT	10 - ELECTRICAL AND ELECTRONICS 93 - TERMINOLOGY
400-499	COMMAND AND SURVEILLANCE	03 - OUTFITTING 06 - SHIP CONTROL AND AUTOMATION 10 - ELECTRICAL AND ELECTRONICS 11 - MACHINERY
500-599	AUXILIARY SYSTEMS	03 - OUTFITTING 05 - HVAC 06 - SHIP CONTROL AND AUTOMATION 08 - DECK MACHINERY 10 - ELECTRICAL AND ELECTRONICS 13 - PIPE SYSTEMS 93 - TERMINOLOGY
600-699	OUTFIT AND FURNISHINGS	01 - MATERIAL 03 - OUTFITTING 10 - ELECTRICAL AND ELECTRONICS 93 - TERMINOLOGY
900-999	SHIP ASSEMBLY AND SUPPORT SERVICES	10 - ELECTRICAL AND ELECTRONICS

TABLE 2-15:

THE CONNECTION BETWEEN THE SWBS GROUPS AND THE F-25 SUBCOMMITTEE IS SHOWN FOR THE FOREIGN STANDARDS WHICH WERE CLASSIFIED.

The load per subcommittee is by no means uniform. Two technical and three administrative subcommittees were not assigned any standards. On the other hand, two subcommittees, namely 03 (Outfitting) and 13 (Pipe Systems) had over 100 standards put under their cognizance. Table 2-16 shows the distribution; Section 2.3.l. concludes observations apropos of each subcommittee.

NUMBER OF FOREIGN STANDARDS	F-25 SUBCOMMITTEE
A	.01 MATERIAL
o	.02 COATINGS
185	.03 OUTFITTING
4	.04 HULL STRUCTURE
7	.05 HVAC
13	.06 SHIP CONTROL AND AUTOMATION
2	.07 GENERAL SUPPORT REQUIREMENTS
6	.08 DECK MACHINERY
1	.09 SUPPORT OPERATIONS
69	.10 ELECTRICAL AND ELECTRONICS
15	.11 MACHINERY
0	.12 WELDING
133	.13 PIPE SYSTEMS
0	.90 EXECUTIVE
0	.91 LONG RANGE PLANNING
0	.92 EDITORIAL
8	.93 TERMINOLOGY
446	TOTAL

TABLE 2-16:

THIS TABLE SHOWS THE NUMBER OF STANDARDS WITHIN THE SCOPE OF EACH F-25 SUBCOMMITTEE

Figure 2-1 graphically shows the non-linear relationship between ASTM F-25 subcommittees and SWBS groups. F-25.03 (Outfit) and F-25.12 (Piping) carry the biggest load of foreign standards-but each from several SWBS groups.

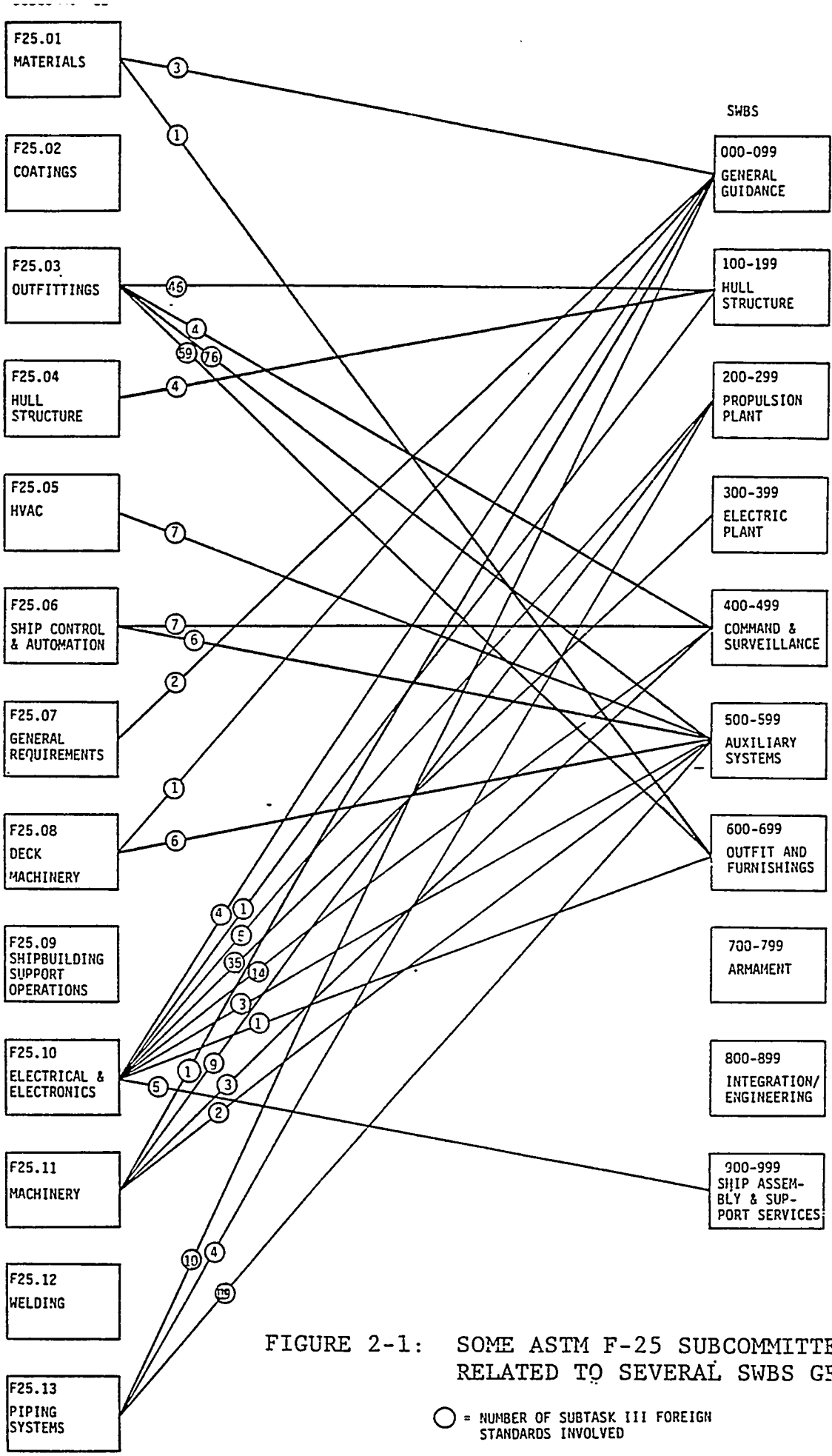

FIGURE 2-1: SOME ASTM F-25 SUBCOMMITTEES RELATED TO SEVERAL SWBS GROUP

2.3.2 Detailed Observations on Subcommittee Assignments

01 Material (Four Standards)

Only four foreign standards covering aluminum, light metals and canvas were catalogued for this subcommittee. However, the small number of standards is the result of the criteria used to select the standards for cataloging, directing attention towards standards which were specifically for shipbuilding, whereas most material standards are intended for use by many other industries. Generally speaking this subcommittee is going to have a very complex task dealing with domestic standards for materials. The quantity and the technical complexity of material standards will be challenging.

02 Coatings (No Standards)

The survey did not uncover any foreign standards for coatings. although many are known to exist. The Swedish standard describing surface profiles after blasting has been issued by ANSI and, because of its widespread U.S. use, will appear in the catalogue of domestic shipbuilding standards.

03 Outfitting (185 Standards)

Forty-one percent of all the standards catalogued applied to outfitting. However, this is not surprising. Outfitting work and material lend themselves to standardization because of many factors including:

- Owners and operators have traditionally had a great deal of interest in the outfitting portions of their ships. Their experience provides them with valid judgement selecting outfitting items. This same feeling of superior expertise did not apply to selection of lines and hull form where the naval architect possessed superior data.

- Outfitting items are much easier to buy from a vendor than are hull parts. Consequently, a valid description o-f the item (i.e., a standard) is sorely needed so that make-buy decisions can be made or so that satisfactory items can be purchased.
- Outfit items lend themselves to engineering improvements. Listing a standard is a good way to control the risk of indiscriminate changes to the product.
- Outfit items tend to be material which can be described adequately-by a standard and do not require extensive technical knowledge of system design for approval. Consequently, standards for outfit material fare better in standards writing and approving groups.
- There are so many different outfit items that it takes a lot of different standards to describe them.

The standards identified to this subcommittee cover ladders, nails, scuppers, cleats, chocks, bollards, scuttles, windows, hatches, cargo lifting gear, and rope.

04 Hull Structure (Four Standards)

For the same reasons that there are many outfit standards, there are very few hull standards. The ones catalogued apply to trenches, covers, and bulkhead pieces.

05 Heating, Ventilation and Air Conditioning (Seven Standards)

These standards cover a very limited number of ventilator details plus covers and doors. An opportunity exists for a standard covering performance of the HVAC system. A standard on performance would be the basis upon which standards for designing, manufacturing, installing, and testing would be written.

06 Ship Control and Automation (Thirteen Standards)

The thirteen standards come from SWBS groups. This gives some indication that this subcommittee will have many interfaces with other subcommittees in developing standards.

07 General Support Arrangements (Two Standards)

Since the assignment of standards to the F-25 subcommittees, 07 General Arrangements and 09 Support Operations have been merged to form the new Subcommittee 09 (General Support Arrangement). This change will not become official until approved by F-25 Executive Subcommittee. The computer runs in Appendix C were completed before this change, so both subcommittees are listed.

08 Deck Machinery (Six Standards)

This is a prime area for developing standards. Mooring winches and anchor windlasses have traditionally been considered custom made items. Many structural detail drawings have been issued with a "reserved" area because deck machinery foundation details were not available from the vendor. A study by Bath Iron Works several years ago revealed that although anchor windlass foundations did vary from vendor to vendor for same capacity windlass, the variation was very small, and a standard hold-down lavout could be developed without forcing any vendor to perform major redesign to his product. At that time, such a standard was proposed, but was not accepted.

09 Support Operations (One Standard)

The activities under the purview of this committee are normally very parochial to each shipyard and not many standards exist in the public domain. The combining of subcommittee 07 and 09 into a single organizational unit will change the workload for the combined group.

10 Electrical and Electronics (69 Standards)

This subcommittee was assigned 15% of all the foreign standards classified. Only the Outfitting and Pipe Systems Subcommittees had more references.

The Electrical Subcommittee has probably the most challenging area in which to work. Recent technological progress has stimulated a changing of the old ways and has dictated that a full review of existing regulations and standards needs to be conducted by an objective group of professionals guided by the needs of the ship and its environment.

11 Machinery (Fifteen Standards)

The standards for review by this group predominantly deal with details of the uptake and were written by the Bremer-Vulkan shipyard.

12 Welding (No Standards)

No foreign standards for welding occurred in the sample covered by this report.

13 Pipe Systems (133 Standards)

As expected, piping, tubing, fittings, gaskets, valves, and hangers are heavily standardized.

ADMINISTRATIVE SUBCOMMITTEE

90 Executive (No Standards)

91 Long Range Planning (No Standards)

92 Editorial (No Standards)

93 Terminology (Eight Standards)

Of the four administrative subcommittees, only Subcommittee 93 (Terminology) was assigned any foreign standard from this sampling. Six of these standards were definitions in the electrical area, one was on deck machinery terminology and one was a glossary of terms for dimensioning accommodations.

3.1 SUMMARY OBSERVATIONS

1. Foreign shipbuilding standards constitute a useful input to the National Shipbuilding Standards Program. For the most part the standards reviewed could be adopted for industry use with little or no modification.

2. Foreign shipbuilders consider that between 500 and 1000 standards specifically written for shipbuilding should be adequate for their needs. A major task of ASTM F-25 will be-to reduce the large number of candidate standards to a reasonable number and yet provides an adequate degree of coverage.

3. There were initially no conflicts and no duplications in the foreign standards processed due largely to the fact that the foreign standards organizations have reciprocal representation and cooperate closely one with the other. The U.S. shculd participate in the ISO/TC-8 Steering Committee and seriously consider reciprocal foreign membership on F-25.

4. Regarding types of standards (e.g., design, specification, test method, etc.) 88% of the sample of foreign standards fell into the Specification Category which is to be expected since foreign standards are used largely to purchase components and parts are used largely to purchase components and parts which can be precisely defined by a specification.

5. Coverage of the Ship Work Breakdown Structure by the 446 standards in the sample is very uneven with the highest concentration of standards (49%) falling within the Auxiliary Systems Group of the SWBS, the next highest concentration (14%) being in Outfit and Furnishings and Hull Structure (13%). All the other SWBS categories had less than ten standards assigned to them.

6. Foreign standards are used extensively in the procurement of purchased components and materials; hence the heavy concentration in the SWBS categories noted in 2 above.

7. Grouping standards into SWBS categories proved much less useful for F-25 subcommittee assignment that grouping of standards into subject categories. Several different subcommittees will have cognizance over standards falling within the same SWBS category.

APPENDIX A
USER'S GUIDE TO THE NSSP CATALOG OF STANDARDS FOR SHIPBUILDING: TASK III - FOREIGN SHIPBUILDING STANDARDS

APPENDIX A

USER'S GUIDE TO THE NSSP CATALOG OF STANDARDS FOR SHIPBUILDING: TASK 111 - FOREIGN SHIPBUILDING STANDARDS

INTRODUCTION.

The National Shipbuilding Standards Program Catalog of Standards currently contains 446 standards from foreign sources. The standards have been sorted four ways: by organization, ship work breakdown area, recommended F-25 subcommittee, and subject. This User's Guide tells how to use the catalog to find standards, and what information is provided for each standard.

The catalog is made up of four individual catalogs, each of which offers a different way of locating standards.

CATALOG BY ORIGINATING ORGANIZATION

In the first catalog, the entries are sorted alphabetically by originating organization, and then by standard number within each organization.

CATALOG BY F-25 SUBCOMMITTEE

Entries in the second catalog are sorted by recommended F-25 subcommittee assignment.

CATALOG BY FUNCTION AREA OF THE SHIP

Each standard is listed under a group- sub-group, or element of the U.S. Navy Ship Work Breakdown Structure (SWBS). SWBS is a functional system oriented classification system which is used to group together standards which deal with functionally related subjects. For instance, SWBS Group 500 covers auxiliary systems; Sub-group 580 covers mechanical handling systems; and Element 582 covers mooring and handling systems. Thus all standards dealing with capstans and mooring winches are found in Element 582. Standards for related items such as boat handling equipment, are found in other elements

in Sub-group 580. Standards which apply to more than one element are assigned to the higher level Sub-group or Group as in Sub-group 580. Standards which apply to more than one element are assigned to the higher level Sub-group or Group, as appropriate. For instance, wire rope is used in several elements of Sub-group 580, and is therefore assigned as SWBS of 580.

For a complete description of SWBS, see Shipwork Breakdown Structure, NAVSEA O9OO-LP-O39-9O1O.

CATALOG BY SUBJECT

Each standard is classified in up to three subject categories in order to group standards which describe like materials or services, regardless of functional area. For instance, blocks appear in both SWBS 573 - Cargo Handling Systems and SWBS 580 - Mechanical Handling Systems. In the catalog by subject, all standards which have been assigned a subject category of “Block” appear together. Note that “Block” is used rather than “Block; Cargo Handling” and “Cargo Handling Block” because SWBS provides a means of grouping cargo handling standards; the subject categories need not do so.

(At the time of the initial report the ADP programs were not fully developed, in that only the first subject category assigned to each standard was used in the catalog by subject. With additional programming, subsequent editions of the catalog can be made to show each standard under all of its subject categories.)

KEY TO CATALOG ENTRIES

Figure 1 is a page of the catalog, marked-up to facilitate reference to the following descriptions of the data elements. Paragraph numbers below refer to circled numbers on Figure 1.

1. Organization Code

This is an up to five character code for the originating organization. In these catalogs, the following organization codes appear:

BV - Bremer Vulkan Schiffbau und Maschinen Fabrik
(German Shipbuilder)

DIN - Deutsches Institute fur Normung
(German Standards Institute)

HDW - Fachnormenausschuss Schiffbau
(a committee of DNA, a shipbuilders' association)

HMN - Hivirich Mohr Elmsworn
(deck hardward vendor)

IEC - International Electrotechnical Commission

IS0 - International Standards Organization

JIS - Japanese Standards Association
(JIS Stands for Japanese Industrial Standard)

RNS - Rheinstahl Nordseewerke Gmb. H. Emden
(deck hardware vendor)

WWN - Wernormer
(abbreviation used in purchase orders to describe product)

2. Number of Standard

This is as assigned by the originating organization.

3. Year of Revision

This is the date of issue or revision of the standard by its originating organization.

4. Year of Reaffirmation

Standards are often reaffirmed without revision. The most current date of reaffirmation is shown. If the most recent action was revision rather than reaffirmation, no reaffirmation date appears.

5. Ship Work Breakdown Structure Code

SWBS is a classification system developed by the U.S. Navy. The functional segments of a ship are classified using a set of groups, sub-groups, and elements which are assigned three digit codes. For a full description of the SWBS, see Ship Work Breakdown Structure, NAVSEA O9OO-LP-O39-9O1O. The major SWBS groups are:

000 - General Guidance and Administration
100 - Hull Structure
200 - Propulsion Plant
300 - Electric Plant
400 - Command and Surveillance
500 - Auxiliary Systems
600 - Outfit and Furnishings
700 - Armament (not used here)
800 - Integration/Engineering
900 - Ship Assembly and Support Services

In addition, items of load, such as stores, are assigned SWBS codes beginning with "F", such as F40- Fuels and Lubricants.

6. Type of Standard

This is a one digit code as follows:

1 - The standard establishes definitions or classifications.
2 - The standard is used primarily in design activities.
3 - The standard is used primarily in production operations.

4 - The standard is used primarily in test and/or inspection activities.

The standard defines limits or boundaries (specifications) on the characteristics of materials, items, systems, or services.

7. Potential Benefits

This is a one digit code representing a rough assessment of the potential industry-wide benefits of the standard, on a scale of o = none to 3 - great.

8. Modification Required for Shipbuilding Use.

This is a one digit code representing an assessment of the standard's readiness for shipbuilding use, on a scale of 1 - major modifications required to 3 - immediately useful.

9. System of Units

The systems of units used in the standard is coded as follows:

M - Metric System or International System (S.I.)
E - U. S. Customary System or British Imperial System
D - Dual Metric/English
N - Not applicable
O - Other
U - Unknown

l0. F-25 Subcommittee

This is the recommended preliminary assignment of the standard to an F-25 subcommittee, according to the F-25 number designations:

01 - Materials
02 - Coatings
03 - Outfitting

04 - Hull Structure
05 - Heating, Ventilation, and Air Conditioning
06 - Ship Control and Automation
07 - General Requirements*
08 - Deck Machinery
09 - Shipbuilding Support Operations
10 - Electrical and Electronics
11 - Machinery
12 - Welding
13 - Piping Systems
91 - Long-Range Planning
92 - Editorial
93 - Terminology

* NOTE that subcommittees 07 and 09 have recently been merged into 07 - General Support Requirements. Later editions will reflect this change.

11 - 13 Synonymous Standard Numbers

Often a standard is issued by more than one organization, each of whom assigns a different number to the standard. Synonymous numbers arise when two. or more organizations collaborate on the standard and each issue it, and when a national or international organization approves and begins to issue a standard prepared by a lower-level organization.

11A, 12A, 13A

These are the codes for organizations other than the originator which issue the standard.

llB, 12B, 13B

These are the numbers assigned to the standard by the above organizations.

14. Subject Category

Each standard has been assigned to one, two, or three subject categories, for the purpose of preparing the subject category catalog.

15. Title

The full title of the standard appears here.

APPENDIX B
PREFERRED WORDS

APPENDIX B

Distribution, Power
Distribution" System, Electrical AC
Distribution System, Electrical, DC
Diversity Factor, Electrical
Documentation, Electrical Measuring Apparatus
Door
Door Fitting
.Door Frame Opening
Drain Fitting
Drain Screw, Tank
Drawing Symbol, Hull
Drydock Grounding Requirement
Duct, Aic

Earthing
Electrical Control, Automatic
Electrical Protection, Over-Voltage and Over-Current
Electrical Protection, Reverse Power, Reverse Current
Electrical Protection, Under-Voltage
Electrical Installations, General 'Requirements
EMI, Reduction of
Enclosure, Control Gear
Enclosure, Generator
Enclosure, Motor
Enclosure, Switch Gear
Engine Order Telegraph
Equipment, Safe

Fairlead
Fire Alarm
Fire Detection
Fire Extinction System
Fire Fighting Fitting
Fire Fighting Water Pressure
Fitting, Electrical, Damp Locations of
Fitting, Electrical, Grounding of
Flag Hoist
Flashlight
Floodlight
Fuel and Oil Pipe Fitting
Fuse, Low Voltage
Fusegear

Gap, Spark
Gasket, Fuel Line
Gasket for Window and Scuttle
Gasket, Pipe Flange
Gear, Steering
Generator
Generator, AC and DC
Generator, Propulsion

Measurement, Pressure and Vacuum
Mooring Winch
Motor, AC and DC
Motor, Electric
Motor, Propulsion

Name Plate
Name Plate Holder

Opening, Clean

Padeye
Pentration, Pipe
Pipe and Cable Hanger
Pipe Bending
Pipe Cap Wrench
Pipe Fitting
Pipe Fitting, Metal
Pipe Fitting, Plastic
Pipe Flange
Pipe Flange Gasket
Pipe Hanger
Pipe Hanger Part
Pipe, Metal
Piping System Marking
Platform, Pilot
Plumbing”
Power Supply, Electric, Automatic Control of Prime Mover
Propeller Tolerances
Pump, Deck Cover

Raft, Life Saving
Rail, Deck
Receptical and Plug, Electrical
Recifier
Rectifier, Semiconductor
Reel, Mooring and Towing Rope
Reel, Mooring Wire Rope
Refrigeration
Relay, Contractor
Resistance, Wire, Calculation of
Rope End Fitting
Rope Tub
Rope Fiber
Rope, Wire

S-Ring
Sanitary System Marking
Screen Clear View
Scupper

Scuttle
Scuttle, Gasket
Scuttle, Rope
Search Light
Semiconductor
Shackle, Mooring Buoy
Ship General Arrangement Marking
Signal Lamp
Signal. Light
Sounding Pipe and Fittings
Speaking Tube
Specification, Cable, Electric
Spring
Sprocket Wheel
Standard Resistance
Starter, Motor, AC
Starter Motor, Low Voltage
Starter, On-Line
Starter, Reduced Voltage, AC
Starter, Star-Delta
Starting, Automatic
Steering Fitting
Steering Gear
Switch, Control, Low Voltage,
Switch, High Voltage
Switchboard
Switchgear
Switchgear, Definitions
Switchgear, Enclosed, High Voltage
Switchgear, High Voltage
Swivel Fitting
Swivel, Cargo Hook
Symbol, Electrical

Tank Fitting
Tanker, Type A,B,C, and D
Telegraph, Engine Room
Telephone, Non-Essential
Terminology, Accommodation Dimension
Terminology, Deck Machinery
Test, Shipboard, Electrical
Test Equipment, Electronic Documentation
Test Equipment, Electronic, Manual
Tolerances, Screw Propeller
Topping Lift Fitting
Towing Hook
Track, Yatch
Transformer, Lighting
Transformer, Power
Tub, Rope
Tubing

Ullage Trunk
Uptake

Valve
Valve Operating Gear
Ventilation System Marking
Ventilator
Ventilator Head
Voltage, AC, Recommended
Voltage, DC, Recommended
Voltage, Standard, 50 Hz
Voltage, Standard, 60 Hz

Water System Pressure for Fire Fighting
Water Tank Fitting
Wheel, Sprocket
Whistle
Winch, Cargo
Winch, Mooring
Window and Light (and Cover)
Window and Light (and Cover), Gasket
Wrench

Yatch Track

APPENDIX C
EXPLANATION OF AN
NSSP INDEXING AND SCREENING FORM

(1) NSSP INDEXING AND SCREENING FORM

(2) DATE _____

(3) 1

(4)	(5)	(6)	(7)	(8)
TRANSACTION TYPE	ORG. CODE	NUMBER OF STANDARD	REV. YEAR	REAFFRM YEAR	SWDS CODE
(9) 1 - ADD (10) [1]				
2 - CHANGE [2]				
3 - DELETE [3]				

(11)	(12)	(13)	(14)	(15)
STANDARD TYPE	POTENTIAL INDUSTRY-WIDE BENEFITS	MODIFICATIONS REQUIRED FOR SHIPBUILDING USE	SYSTEM OF UNITS	F-25 SUBCOMMITTEE ASSIGNMENT
1-DEF & CLASS 2-DESIGN 3-PROD & OPR 4-TEST 5-SPEC	0-NONE 1-MARGINAL 2-MODERATE 3-GREAT	7- MAJOR 2-MINOR 3- NONE	M-METRIC/ST E-ENGLISH N-NOT APPLIC. U-UNKNOWN O-OTHER D-BOTH METRIC & ENGLISH	

(16) FULL TITLE OF STANDARD

(17) SUBJECT CATEGORIES

1 _____

2 _____

3 _____

APPENDIX C
EXPLANATION OF AN NSSP INDEXING AND SCREENING FORM

(1) National Shipbuilding Standards Program

(2) Initials of analyst and date form was filled out.

(3) Instruction code to computer, See (9)

(4) Five letter code to identify organization which issued the standard

(5) Number used by the originating organization to identify the standard

(6) Last two digits of year in which the standard was last revised

(7) Last two digits of year in which standards was last re-affirmed without revision

(8) Navy ship work breakdown structure code assigned to this standard

(9) Code used in (3) to instruct computer what action to take with information on this form

(10) The identification of the same standards under one to three different names

(11) The predominant type of information covered by the standard

(12) Cost and risk reduction potential if the standard were fully applied in the Maritime Industry

(13) Degree to which modification seeem needed before standard is useful

(14) Units used in standard

(15) Tentative assignment to F-25 Subcommittee

(16) This is the table given to the standard by the originating organization

(17) Up to three subjects can be listed to show what is included in the standards

(18) Section to record standards when cited as a part of another standard

APPENDIX D
ADP PRINTOUTS

APPENDIX E
ADDRESSES OF FOREIGN STANDARDS ORGANIZATIONS

APPEIJDIX E

ADDRESSES OF FOREIGN STANDARDS ORGANIZATION S

How to Obtain Standards Evaluated in Sub-task III

A limited number of english language versions of the 1SO, IEC, SIS, and JIS standards may be obtained by writing or telephoning, ANSI the sales agents for the stnadards organizations listed below. Each of these standards organizations publishes a catalogue listing all of the standards it has sponsored and-indicating which standards have been translated into English. Becuase of copyright laws, neither Bath Iron Works nor Corporate-Tech Planning will be able to supply copies of standards.

CODE	STANDARDS ORIGINATING ORGANIZATION
SIS	Swedish Institute of Standards BOX 3295 10366 Stockholm, Sweden Phone 08-23-04-00
DIN	German Institute for Standards Institute for Normung e.v. BEUTH VERLAG GMBH Auslie (erun) Postfach 1145 D-1000 Berline 30 Germany Phone 030-26-02-331
IEC	International Electrotechnical Commission 1, Rue Varemb 1211 Geneva 20 Switzerland Phone 41-22-34-01-50
1S0	International Organization for Standardization 1, Rue de Varembe 34-12-40 Casi Postal 56 Ch 1211 Genva 20, Switzerland Phone 41-22-34-1240
JIS	Japanese Industrial Standards The Association of Marine JIS Somitomo Bank Toranomon Bldg. No. 7 Shiba-Kotohiracho, Minato-Ku Tokyo, Japan

English language versions of the standards are available from the U.S. sales agent for all the above standards groups. Contract:

American National Standards Institute
1430 Broadway
New York, NY 10018
Phone 212-354-3473

The shipbuilding company standards are not all translated into English. For more information about these standards, contact Mr. James A. Burbank II, Executive Staff Member, Corporate-Tech Planning, Inc., The Hill Portsmouth, New Hampshire 03801.